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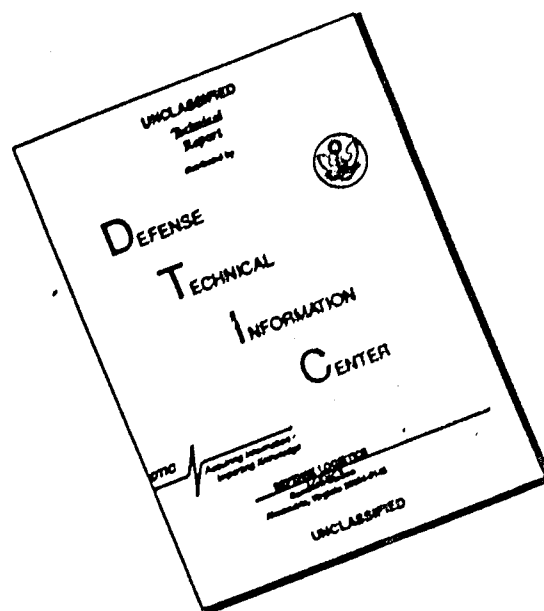
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**DEPARTMENT OF THE ARMY  
OFFICE OF THE ADJUTANT GENERAL  
WASHINGTON, D.C. 20310**

IN REPLY REFER TO

AGAM-P (M) (20 Jul 69) FOR OT UT 692234

5 August 1969

SUBJECT: Operational Report - Lessons Learned, Headquarters, 54th Field Artillery Group, Period Ending 30 April 1969 (U)

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2. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations and may be adapted for use in developing training material.

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*Kenneth G. Wickham*

KENNETH G. WICKHAM  
Major General, USA  
The Adjutant General

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54th Field Artillery Group

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DEPARTMENT OF THE ARMY  
HEADQUARTERS, 54TH FIELD ARTILLERY GROUP  
APO San Francisco 96491  
UIC WAO3

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15 May 1969

SUBJECT: Operational Report of Headquarters, 54th Field Artillery Group for  
Period Ending 30 April 1969, RCS CSFOR-65 (U)

THRU: Commanding Officer  
II Field Force Vietnam Artillery  
ATTN: AVFB-FAC  
APO 96266

Commanding General  
II Field Force Vietnam  
APO 96266

Commanding General  
United States Army Vietnam  
ATTN: AVHGC-DH  
APO 96375

Commander-in-Chief  
United States Army Pacific  
ATTN: GPOF-EE  
APO 96558

TO: Department of the Army  
ATTN: ACSFOR, DA  
Washington, D. C. 20310

1. (C) Section I. Operations: Significant Activities.

a. Personnel.

(1) Command Changes: LTC William A. McSpadden assumed command of the  
2d Battalion, 35th Field Artillery from LTC Edgar G. Miles on 18 April 1969.

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- (2) Infusions: None
- (3) Rotational Hump: None
- (4) Levies: None
- (5) Personnel strength on last day of reporting period was:

<u>UNIT</u>	<u>OFF</u>	<u>AUTH</u> <u>WO</u>	<u>EM</u>	<u>OFF</u>	<u>ASG</u> <u>WO</u>	<u>EM</u>
HQB, 54th FA Gp	27	5	109	41	8	122
7th Bn, 8th FA	37	6	522	34	4	528
7th Bn, 9th FA	38	5	485	41	3	477
2d Bn, 35th FA	37	6	494	39	5	496
5th Bn, 42d FA	<u>37</u>	<u>6</u>	<u>555</u>	<u>33</u>	<u>3</u>	<u>557</u>
TOTALS	176	28	2165	188	23	2180

- (6) Critical MOS shortages were:

<u>MOS</u>	<u>TITLE</u>	<u>GRADE</u>	<u>AUTH</u>	<u>SHORT</u>
13B40	FA Crewman	E4/E6	227	27
13E40	FA Opn & Intel Asst	E5/E6	42	34

- (7) Personnel changes during this reporting period:

<u>GAINS</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>	<u>LOSSES</u>	<u>OFF</u>	<u>WO</u>	<u>EM</u>
	53	6	701		59	6	646

- (8) Casualties:

<u>TYPE</u>	<u>NUMBER</u>
Killed in Action	0
Wounded in Action	3
Non-Battle Dead	0
Non-Battle Casualties	9

- (9) Pertinent Medical Service Statistics:

Admitted to Hospital	25
Infectious Hepatitis	1
Malaria Cases	1

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(10) Awards and Decorations:

<u>TYPE</u>	<u>NUMBER</u>
Legion of Merit	0
Silver Star	0
Bronze Star	94
Air Medal	24
Army Commendation Medal	197
Purple Heart	5
Good Conduct Medal	126

(11) Judicial and non-judicial actions:

<u>UNIT</u>	<u>ART 15</u>	<u>SCM</u>	<u>SPCM</u>	<u>GCM</u>
HQB, 54th FA Gp	20	0	0	0
7th Bn, 8th FA	20	0	4	0
7th Bn, 9th FA	29	0	1	0
2d Bn, 35th FA	33	0	1	0
5th Bn, 42d FA	<u>5</u>	<u>2</u>	<u>0</u>	<u>0</u>
TOTALS	107	2	5	0

(12) Reportable accidents:

<u>UNIT</u>	<u>VEHICLE</u>	<u>AIRCRAFT</u>	<u>PERSONNEL</u>
HQB, 54TH FA Gp	1	0	0
7th Bn, 8th FA	0	0	2
7th Bn, 9th FA	0	0	2
2d Bn, 35th FA	3	0	0
5th Bn, 42d FA	<u>0</u>	<u>0</u>	<u>2</u>
TOTALS	4	0	6

(13) R&H

(a) Out-of-country:

<u>LOCATION</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>
Tokyo	11	12	10
Hawaii	41	40	45
Hong Kong	25	25	17
Bangkok	28	28	35
Australia	27	35	32

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<u>LOCATION</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>
Manila	0	0	0
Taipei	14	15	16
Singapore	16	20	15
Penang	4	0	0
Kuala Lumpur	<u>5</u>	<u>5</u>	<u>4</u>
TOTALS	171	180	174

(b) In-country (Vung Tau):

	<u>FEB</u>	<u>MAR</u>	<u>APR</u>
OFF	4	4	4
EM	<u>20</u>	<u>18</u>	<u>20</u>
TOTALS	24	22	24

(14) Commander's Note: None.

b. Operations:

(1) The number of missions and rounds fired by units of the 54th Field Artillery Group during the reporting period were:

<u>UNIT</u>	<u>MISSIONS</u>	<u>ROUNDS</u>
7th Bn, 8th FA		
8"	4,236	15,463
175mm	3,558	12,614
7th Bn, 9th FA		
105mm	9,330	55,634
2d Bn, 35th FA		
155mm	2,838	38,449
5th Bn, 42d FA		
155mm	<u>5,121</u>	<u>47,535</u>
TOTALS	25,083	169,695

(2) The Group calibration team calibrated six firing batteries with the Radar Chronograph, M-36, during the reporting period. Calibration assistance was provided to the 2d Battalion, 4th Field Artillery, 9th Infantry Division Artillery.

(3) The Bien Hoa Tactical Area Command (BHTAC) Fire Support Coordination Element completed its sixth month of operation on 5 May 1969. Since the last report the Long Binh/Bien Hoa Complex has experienced 10 rocket and mortar attacks and one ground attack. Casualties and damage sustained, range from negligible to light. The most significant attacks occurred during the TET

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Offensive, 23 - 27 February. Artillery support for the period of TET involved the coordination of the equivalent of 28 batteries or 134 tubes, ranging from mortars to 175mm guns. Coordination of the BHTAC/LBSZ counter mortar/rocket program remains a major activity. Counter mortar/rocket reaction times during attacks have averaged one minute 32 seconds from the report of incoming to first rounds "shot". Average expenditures have been 440 rounds of artillery per rocket attack. The maximum counter mortar/rocket program expenditure, 1,450 rounds, was fired the night of 27 February 1969. On 13 April 1969 the BHTAC counter mortar/rocket program was expanded from 317 targets to 356 targets. With the old program we were able to preclear only 31% each evening. With the new program we have been averaging 45% of the targets precleared each night. Experience has shown that immediate response and a heavy volume of fire on as many targets as possible, while not completely denying the enemy the ability to fire rockets and mortars, has forced him to shoot from maximum range. During the reporting period sensor devices were incorporated into the BHTAC defense. A total of 86 targets were planned on these devices and each evening as many targets as possible were precleared for immediate firing should a sensor be activated. Because unobserved artillery firing techniques were used surveillance was negative. To accurately locate sensor devices, a form of survey was conducted using our AN/MPQ-4 counter mortar radars in conjunction with aircraft hovering directly above the devices. An average of several readings was used to provide data for target planning. Continuous training of flash tower personnel (including a minimum of two tests per night) has resulted in greater speed of target acquisition and greater accuracy. Test averages show that from simulated launch to first usable target grid only thirty six seconds elapse. Radial errors reported by the towers averaged 123 meters with six of our ten towers obtaining sightings on each test. Counter mortar/rocket "reaction time" tests, begin at the time the target is assigned to the fire control headquarters and ends at "shot". Elapsed times during these tests have averaged one minute forty six seconds. A minimum of four tests are conducted each evening. Artillery Warning Control Center (AWCC) activities remain unchanged. Traffic with Army aircraft averages over one thousand broadcasts daily. On 19 April 1969 BHTAC/LBSZ vacated the 101st Division Rear TOC and set up operations in the II Field Force alternate TOC located at the III Corps Compound. Facilities and communications are greatly improved in that we have; a greater backup capability for existing wire and radio circuits; RTT capability and eventually, UHF communications for the AWCC. Rearrangement of the various US and ARVN Staff agencies with the new TOC provides for a more timely exchange of information and has speeded up clearance requests for artillery fires. In addition, our new location within the III Corps Compound has generated greater rapport with the ARVN and provides us a better opportunity to influence their procedures.

(4) During the period from 1 February 69 to 30 April 69, the Aviation Section of the 54th Field Artillery Group received three OH-6A helicopters and one OH-23G. This provides a present strength of six OH-6A and one OH-23G aircraft for the 54th Field Artillery Group. Two new aviators were added to

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the Aviation Section which now has the strength of nine aviators and an Aviation Officer. Army Schools attended by the Aviation Section during this quarter included four pilots attending OH-6A transition school at Vung Tau and three pilots being transitioned at Phu Loi. Two enlisted men also attended courses taught at Vung Tau on the subjects of PLL and maintenance. By 25 March 1969, major construction of the 54th Field Artillery Group, Headquarters Heliport had been completed. This included the building of eight aircraft revetments, addition of two transit pads and the penepriming of the entire airfield. Construction was also started on the Airfield Maintenance area. During this period, the Aviation Section of the 54th Field Artillery Group had an aircraft availability rate of eighty-two percent with no aircraft accidents. 4,979 missions were flown totaling 1,603 flight hours, carrying 3,303 passengers and 28,000 pounds of cargo.

(5) Tests of the immediate response firing tables for improved conventional munitions were conducted east of FSPB Concord on 12, 18, 21, 26, and 29 April 1969. The tests were conducted by the operations section of 54th Field Artillery Group under the direction of MAJ Maynard C. Forbes. Three main objectives were assigned to the series of tests. These objectives were to determine the effects of low level winds on the dispersion and impact of the ICM grenades, the actual impact range and grid of the empty ICM projectile, the dud rate of the individual grenades in a variety of vegetation, and a comparison between the M43 series grenades found in the 155mm, 8" shells (M449 and M404) and the M39 grenade of the 105mm ICM shell (M444). For results of these tests see para b(1) Section II.

### c. Training.

(1) The 54th Field Artillery Group conducted Aerial Observer Orientation courses 11 - 13 February and 21 - 23 April 1969. Ten students received instruction on the O-1 Birdog aircraft and the OH-6A helicopter in relation to visual reconnaissance requirements in III Corps Tactical Zone.

(2) Two fire direction officer courses were conducted at Group during the reporting period. The first course was 27 January to 2 February and the second was 31 March to 6 April 1969. Sixteen newly assigned fire direction officers attended the instruction.

(3) Replacement training during the reporting period has been arranged through the 199th Light Infantry Brigade Combat Training Center. Newly assigned personnel, E6 and below attend the one week replacement school within one week of arriving in Group.

(4) A three day class for maintenance officers was conducted 10 - 12 March 1969. Nine officers attended the instruction which stressed TAEs.

(5) A two hour class on drug abuse was given on 29 April 1969. All

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NCOs in the Group Headquarters and Headquarters Battery attended the class which was given by the CI Detachment, 8th MP Group.

(6) A four hour course of instruction on the Uniform Code of Military Justice was given on 28 April 1969 by the Staff Judge Advocate General Section, II Field Force Vietnam. Fourteen officers within the Group attended the instruction which included a discussion of Article 15, Article 31, and summary and special court martials.

(7) A FADAC Field Service Engineer from Headquarters, 1st Logistical Command visited all units of the Group 7 - 23 April 1969. Technical assistance and operator training was provided to all fire direction officers and FADAC operators assigned to Group.

(8) In a continuous effort to improve the gunnery standards within the command, the Group Gunnery Inspection Team conducted five gunnery inspections of units of Group.

(9) Continued emphasis is being placed on driver training and selection. A refresher training program has been initiated to orient all personnel with the safety hazards of the approaching wet season.

### d. Intelligence:

(1) During the reporting period, support O-1 aircraft flew the following missions:

<u>TYPE</u>	<u>MSNS</u>	<u>HOURS</u>
Visual Reconnaissance	468	1,283
Convoy Coverage	10	27

(2) The visual reconnaissance program produced one hundred and seventy-six significant sightings. Three hundred and twenty registrations and seventy-two "will adjust" missions upon targets of opportunity were conducted by aerial observers on visual reconnaissance missions.

(3) The Group continued its program of observing the firing of intelligence targets. As a result of this effort two hundred and sixty-nine intelligence targets were observed. The greatest obstacle to this program continues to be the obtaining of clearances to fire artillery during the hours of the aircraft mission.

(4) During the reporting period liaison was maintained with the following intelligence agencies:

(a) 3d Bn, 525 Military Intelligence Detachment (MID)

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- (b) BIEN HOA Sector Advisors
- (c) BIEN HOA National Police
- (d) 179th Military Intelligence Detachment (MID)
- (e) 1st Military Intelligence Bn, Aerial Reconnaissance Support (MIBARS)
- (f) 73d Surveillance Aircraft Company (SAC)
- (g) BIEN HOA Tactical Area Command
- (h) II Field Force Vietnam Artillery
- (i) All subordinate Battalions
- e. Logistics:
  - (1) Supplies:

Repair parts supply was generally good. Below are listed the repair parts not available through logistic channels which resulted in excessive downtime for track and wheel vehicles:

<u>REPAIR PART</u>	<u>FSN</u>
Transfer (M548)	2520-918-0599
Transmission & Transfer (M151)	2520-678-1808
Engine (M54A2)	2815-974-7407
Injector Pump (M54A2)	2910-861-1408
Engine (M37)	2805-649-8548

(2) Maintenance:

(a) Artillery downtime for units assigned to the Group is as shown below:

<u>TYPE UNIT</u>	<u>AVAILABLE DAYS</u>	<u>DOWNTIME DAYS</u>	<u>% D/L</u>
M548	2,670	308	11.5%
105mm (T)	1,602	0	0.0%
155mm (T)	1,602	6	0.3%
155mm (SP)	1,602	5	0.3%
8 in (SP)	535	4	0.7%
175mm 8" (SP)	535	0	0.0%

(b) FADAC downtime for units assigned to Group is as shown below:

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<u>TYPE UNIT</u>	<u>AVAILABLE DAYS</u>	<u>DOWNTIME DAYS</u>	<u>% D/L</u>
105mm(T)	356	29	8%
155mm(T)	356	61	17%
155mm(SP)	356	43	12%
175mm(SP)	356	0	0%

### 1. Organization:

(1) The 54th Field Artillery Group remained assigned as a major subordinate command of USAFV with headquarters at Long Binh (YT 047117). Commanding Officer, II Field Force Vietnam Artillery retained operational control of the Group.

(2) The mission of the 54th Field Artillery Group was General Support, II Field Force Vietnam.

(3) The 6th Battalion, 77th Field Artillery is no longer assigned to the 54th Field Artillery Group. The turnover of all equipment to the 213th ARVN Artillery Battalion was completed on 25 April 1969.

(4) See Organizational Chart on following page.

### g. Other:

#### (1) Civil Affairs:

(a) During the period, increased emphasis was placed upon improving the quality and quantity of civil affairs projects. Direct coordination with Bien Hoa Province and Long Khanh Province provided several areas in which extensive civil actions programs could be provided.

(b) Major construction and repair projects either initiated or completed during the reporting period are as follows:

1. Van Hai School (Long Thanh, Bien Hoa) Three room school completely built through material assistance from the 7th Battalion, 9th Field Artillery.

2. Can Guico orphanage given materials to repair buildings. 5th Battalion, 42d Field Artillery provided the materials.

3. Xuan Loc Province hospital Waterhouse provided by 54th Field Artillery Group to maintain cleanliness and health conditions.

4. Khu Gia Vien (Bien Hoa) Brush burned from around the hamlet where 10 new houses were recently completed.

5. Long Thanh (Bien Hoa) Roofing material provided for a school.

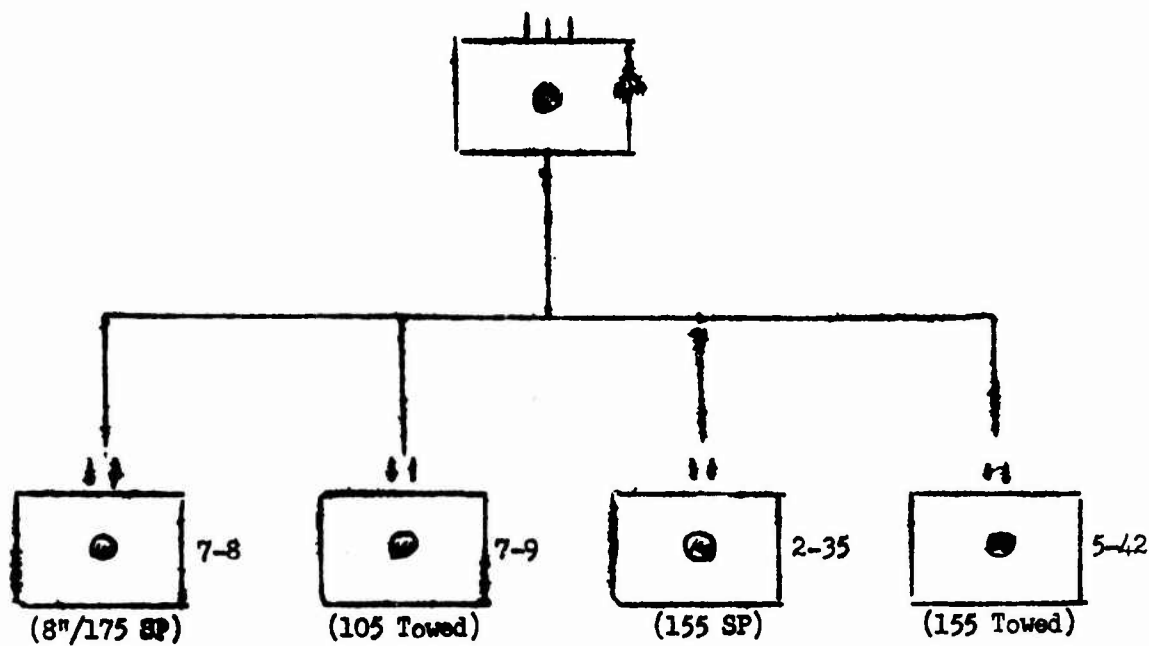
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## ORGANIZATION



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6. Xom Voun (Long Thanh, Bien Hoa) Materials for a school provided by the 5th Battalion, 42d Field Artillery.

7. Bien Hoa City (Bien Hoa) Materials for a school provided by the 7th Battalion, 8th Field Artillery.

8. Xuan Loc (Long Thanh) Doors and windows were provided to finish a project of providing housing for ARVN dependents.

9. Xuan Loc (Long Khanh) Tin and lumber were provided by the 2d Battalion, 35th Field Artillery to repair a church and orphanage.

(c) Medical Civil Action Program (MEDCAP) results:

<u>MONTH</u>	<u>NUMBER OF MEDCAPS</u>	<u>PATIENTS TREATED</u>
February	4	319
March	6	754
April	<u>12</u>	<u>1,730</u>
TOTALS	22	2,803

(2) Public Information:

(a) During the reporting period all Home Town News Releases from the Group were sent via II Field Force. Those distributed by this office to the Home Town News Center are as follows:

<u>MONTH</u>	<u>RELEASES</u>
February	113
March	*25
April	<u>*11</u>
TOTAL	149

\*Releases were reduced for March and April because Group units are required to submit news releases directly to II Field Force.

(b) Twenty two feature stories were released to USARV for distribution to all news media and to newspapers in the states, during the reporting period.

(c) Nineteen hundred and seventy two photographs were reproduced during the reporting period.

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### (3) Communications:

(a) The Group Communications Center handled the reception of six hundred forty two messages and transmitted eight hundred two over organic RTT equipment.

(b) A total of six thousand sixteen messages were received and nine hundred forty two released by the Group Communications Center. Of those totals, eighty nine point four percent (89.4%) of received messages and eighty point nine percent (80.9%) of released messages were of PRIORITY and higher precedence.

(c) A total of six modified X-mode cables have been distributed down to the Battalions. This will provide for secure FM communications within each Battalion.

(4) Medical Activities: A program of sanitation team upgrading has been instituted during this reporting period. This program includes school training, on the job training, and the education of battery commanders in the proper utilization of sanitation teams. Initial reports look very promising for a successful program.

### 2. (C) Section II. Lessons Learned: Commander's Observations, Evaluations, and Recommendations:

a. Personnel: None

b. Operations:

(1) Employment of Improved Conventional Munitions in the immediate response role.

(a) Observation: Little data is available on the effects of low level winds, the malfunction rate, and the canister impact when employing Improved Conventional Munitions in the immediate response role. 54th Field Artillery Group conducted tests with the results indicated below.

(b) Evaluation: The first series of tests was fired from A Battery 2d Battalion, 35th Field Artillery, 155mm, M109, located at grid YT 03381766, on 12 and 18 April 1969. The second series of tests was fired from A Battery, 7th Battalion, 9th Field Artillery, 105mm, M101A1, located at grid YT 03411766, on 21, 26, and 29 April 1969. A total of 14 rounds of shell M449, 155mm, was expended, and a total of 41 rounds of shell M444, 105mm, was expended. The difference in the number of rounds fired by each caliber was due to fire clearance limitations. The tests were scheduled at different times of the day to subject the grenades to a variety of weather conditions, which resulted in a better over-all analysis of the three designated objectives.

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1. Effects of Low Level Winds on the Dispersion and Impact of Individual ICM Grenades: The first objective of the tests was to determine the effects of low level winds on the dispersion and impact of individual ICM grenades. To measure the effects, firings were made at different times of the day, with varying wind direction and velocity. Low level winds were measured at the firing position by the meteorological section from the 7th Battalion, 8th Field Artillery. The premise of the test was: If the effect of low level winds was the major contributing factor to the dispersion of the individual grenades upon expulsion from the projectile or during descent after expulsion, the result of the effect would be an actual impact grid different from the expected grid of impact computed from the firing table addendum, in the amount of the low level wind unit correction listed in the addendum multiplied by the low level wind velocity. The procedure used in this portion of the test was to lay the howitzer on one deflection and fire 10 rounds, all at the same tabular firing table data for ICM immediate response. Special care was taken to insure that the same firing data was placed on the weapon and each fuze for every round fired. The actual grid of effect impact for each round was determined by an AN/MPQ-4A radar of the 8th Target Acquisition Battalion, 25th Field Artillery, located at grid XT 973148. Low level winds were measured at the firing position during the actual firing. Using the fired elevation as an entry argument, a unit correction factor for a low level wind of one knot was extracted from the appropriate addendum; the actual wind speed in knots was multiplied by the unit correction factor, yielding a first apparent range correction for low level winds to apply to the expected impact range of the grenades. Next the grids of impact from the radar were averaged (excluding the obvious rounds that fell outside of a normal dispersion pattern, these being the first or possibly second round fired, before velocity trends had stabilized) and compared with the expected grid of impact (determined by polar plotting the deflection fired and the range listed in the firing tables). From the expected grid of impact computed from the firing tables (Adjusted Data) to the actual average grid of impact reported by the radar (Chart Data) was the magnitude of the correction needed to bring the expected grenade impact to the actual impact grid. From the radial difference in the grids, a second apparent wind correction was extrapolated, using the measured necessary correction and wind direction and velocity. This correction was compared to the first apparent low level wind correction computed, and it was found that there was no correlation between the two values. This indicated that something other than low level winds was effecting the round-to-round dispersion of the ICM grenades. The computation comparisons, along with firing the grenades when the wind velocity was less than 2 knots, bears out the fact that there was some other contributing factor that accounted for the dispersion. After further testing including actual inspection of the grenade carriers in the impact area, data indicates that wind has very little, if any, effect on the ICM grenades. The "wings" of the carrier body only orient the grenade's fuze toward the ground. Fuze setting was found to be the largest dispersion determining factor. Human error in setting the M565 fuze and the manufacturer's tolerance built into the fuze are responsible for the round-to-round

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dispersion of the grenades during the firing of several rounds at the same data. This "human dispersion factor"; minor variations at the weapon caused by settling from previously fired rounds, accuracy limitations of the fire control instruments, and play in the elevating and traversing mechanisms; round to round muzzle velocity variations; and normal dispersion of the grenades will provide a large effect pattern at any range listed on the immediate response firing tables.

### Conclusions:

- a. That low level winds have an insignificant effect on the impact of either the M43 or M39 ICM grenades.
- b. That the dispersion of grenades from round-to-round is desirable to engage a threatening target in a self-preservation situation.
- c. That due to the dispersion, firing of the ICM round in an immediate response role should not be closer than 300 meters from the tube. This should not present a major problem as most positions have their outer perimeter at least 300 meters from the weapons. Firing any closer than 300 meters should only be considered in an emergency situation, after giving careful consideration to the overhead cover of friendly troops and the friendly casualties which might be caused by the round. To place the effect closer than the minimum listed range on the immediate response cards, the time setting must be reduced on the M565 fuze, resulting in an earlier release and thus a shorter range. Allowances must be made for the lower release, as the grenades will have less time to orient their fuzes toward the ground, resulting in a higher malfunction rate.

### Recommendations:

- a. That low level winds of moderate velocity (5-30 knots) not be considered in the immediate response employment of Improved Conventional Munitions.
  - b. That Improved Conventional Munitions employed in the immediate response role be limited to firing at a minimum range of 300 meters from friendly positions, unless directed to do so by the position commander under emergency conditions.
2. Malfunction Rate of Individual Grenades: The second objective was to determine the actual percentage of grenade malfunctions that could be expected with the M43 and M39 grenades. These percentages could be used by the FDO to determine an adequate number and density of rounds to expend on a given size target with his particular caliber weapon. The tests were conducted in three types of terrain: Relatively open areas, light shrubbery, and heavy six to eight foot vegetation. The premise of the test was that

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the heavier the vegetation, the greater the number of malfunctions. The procedure of the test was to conduct several firings with each type of grenade into the three types of terrain. After firing a team would move into the area and physically count the number of grenades that had not detonated. Using these figures a dud percentage was computed and assumed to be characteristic of the total number of grenades as all the carriers could not be found, especially in the heaviest vegetation. First the M43 grenades were fired into a clear area and into fairly light shrubbery. A dud rate of approximately 2 - 5 % was experienced with the 155 and 8" grenade. The majority of the malfunctions were on the ground, with their "wings" still folded. Some were open and sitting on their fuze with half of the carrier buried from the impact of hitting the ground. Two of the M43 grenades rebounded but failed to detonate. When the M43 grenades were fired into heavy vegetation, a dud rate of approximately 30% was experienced. The majority of malfunctions in this instance were found suspended by their "wings" in the heavy foliage. They were generally down in the center of the vegetation, indicating that the fuze had probably struck some of the foliage, but failed to actuate the expelling charge to propel the grenade out of the carrier. This relative insensitivity of the M43 grenade fuze was evident throughout the tests. The second phase of this portion of the test was to fire the M39 grenades into the same area and to determine the malfunction rate as compared to that of the M43 grenade. The M39 grenades were fired into the cleared area, and only one grenade was found to have been a dud, it had expelled from the carrier but had not detonated. This produced a malfunction percentage of 0.5%. The second firing was into light shrubbery, where again only one malfunction was found for a percentage of 0.5%. The last firing was into the heavy vegetation. Only 2 malfunctions were located, and approximately 200 carriers were counted. This 1.0% malfunction percentage in heavy vegetation is indicative of the extreme sensitivity of the M39 grenade's fuze. It has approximately five times the fuze area of the M43 grenade and, unlike the M43 fuze, it will cause the expelling charge to detonate, regardless of the angle of fall.

### Conclusions:

- a. The M39 grenade has an extremely low malfunction rate, in any type of vegetation.
- b. The M43 grenade has a high malfunction rate in heavy vegetation; however, the larger number of M43 grenades carried in the M449 and M404 shells compensates for the high malfunction rate, keeping the round effective in heavy vegetation, by sheer numbers.
- c. The M43 grenade is much less sensitive than the M39 grenade.

### Recommendations:

- a. Firing of ICM to engage all personnel targets, regardless of vegetation, should be increased.

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b. A feasibility study of replacing the M43 grenades with M39 grenades should be conducted.

2. Canister Impact: The third objective of the test was to determine the ballistic characteristics of the ICM projectile once the grenades had been expelled. This information is needed to accurately predict a canister impact grid for safety purposes. The premise of the test was that the canister, after air action, would continue on the same trajectory as it would if the fuze malfunctioned, impacting at a predictable grid location. The procedures of this phase of testing was to fire ten rounds at a constant deflection, fuze setting, and quadrant elevation. The canister impact of each round was determined by the 8th Target Acquisition Battalion, 25th Field Artillery AN/MPQ-4A radar, located at grid YT 023152. The ten rounds were averaged (eliminating rounds falling outside the normal dispersion pattern, these being usually the first or second rounds fired, before velocity trends had stabilized) and a mean point of canister impact determined. This mean location was then compared to the predicted impact grid, computed from shell HE expected achieved range when fired at the same elevation as the ICM. There was considerable discrepancy between the expected impact grid and the actual mean impact. This difference, however, did not remain constant, as varying the fuze setting while retaining the same deflection and quadrant, resulted in extremely different canister achieved ranges. This varied from 300 meters short of to 600 meters beyond the expected impact. All the rounds fired with the same fuze setting impacted within a 150 meter circle. Most could be encompassed within an 80 meter circle. The determining factor in the unpredictable canister impact resulting from changing the fuze setting was deduced by considering the physical characteristics of a ballistic trajectory. Once a projectile is established in a predictable trajectory plane, the only way the trajectory may be changed is by introduction of additional force acting on the projectile. This additional force is provided by the expelling charge as it ejects the grenades from the projectile. The magnitude of this force is considered relatively constant round-to-round. The next characteristic to consider is that a projectile does not symmetrically inscribe a trajectory as it travels through the atmosphere, but as it leaves the muzzle of the tube its nose will be positioned outside of the path of travel, forming an angle called YAW with the trajectory being inscribed by the projectile's center of mass. YAW is greatest along the ascending branch of the trajectory. In addition, due to the Magnus and Cushioning effect, the nose of the projectile will precess about the projected trajectory being inscribed by the projectile's center of mass. It will theoretically spend as much time below the trajectory (negative YAW) as above (positive YAW). Therefore, depending upon the fuze setting the additional force will be applied to the projectile as it is oriented differently in relationship to the trajectory, resulting in different achieved canister ranges.

### Conclusions:

a. Actual canister achieved range is directly dependent upon projectile

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orientation with respect to the large YAW angle present on the ascending leg of the trajectory.

b. That a 1000 meter circle about the expected HE grid of impact (or malfunction grid) is sufficient cleared area for canister impact.

Recommendations: That additional tests be conducted where all times listed on the immediate response firing tables may be fired, and an experience canister achieved range be determined for each fuze setting.

(c) Recommendations:

1. That the above information be made available to all artillery units.
2. That recommendations made in paragraph b(1)(b), Section II of this study be given consideration.

c. Training: None

d. Intelligence:

(1) Observation: Enemy forces continue to use the hours of darkness for tactical movement and supply activities. An on-station aerial observer can detect a significant amount of this activity. Observers can also be directed to areas of activity reported by ground elements.

(2) Evaluation: The night observation program conducted during this reporting period has proven to be effective. Observers have detected enemy movement, base camp areas, mortar/rocket launching sites, and river crossing points. Movement detected by ground surveillance radars has been confirmed or negated by aerial observers. An on-station observer allows for effective adjustment on these lucrative targets. Observers have also detected secondary explosions resulting from firings on interdiction and intelligence targets.

(c) Recommendation: That air assets for the 54th Field Artillery Group be increased to permit nighttime operations on an expanded basis.

e. Logistics: None

f. Organization: None

g. Other: None



RICHARD L. POWELL  
Colonel, FA  
Commanding

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AVFB-FAC (15 May 69) 1st Ind

SUBJECT: Operational Report of Headquarters, 54th Field Artillery Group  
for Period Ending 30 April 1969, RCS CSFOR-65 (U)

DA, HEADQUARTERS, II FIELD FORCE VIETNAM ARTILLERY, APO 96266

27 MAY 1969

TO: Commanding General, II Field Force Vietnam, ATTN: AVFBC-RE, APO 96266

The quarterly report of the 54th Artillery Group adequately reflects the operations and lessons learned during the reporting period.

  
L.D. KINNARD  
Brigadier General, USA  
Commanding



AVFBC-RE-H (15 May 69) 2nd Ind

SUBJECT: Operational Report of Headquarters, 54th Field Artillery Group for  
Period Ending 30 April 1969, RCS CSFOR-65 (U)

DA, HQ II PFORCEV, APO San Francisco 96266 : 9 JUN 1969

THRU: Commanding General, US Army Vietnam, ATTN: AVAGC(DST), APO 96375

Commander-In-Chief, US Army Pacific, ATTN: GPOP-DT, APO 96558

TO: Assistant Chief of Staff for Force Development, Department of the  
Army, Washington, D.C. 20310

This headquarters has reviewed and concurs with the Operational Report -  
Lessons Learned of Headquarters, 54th Field Artillery Group for the period  
ending 30 April 1969.

FOR THE COMMANDER:

  
B. G. MACDONALD  
1LT, AGC  
Asst AG

AVHGC-DST (15 May 1969) 3d Ind

SUBJECT: Operational Report of Headquarters, 54th Field Artillery Group  
for Period Ending 30 April 1969, RCS CSFOR-65

HEADQUARTERS, UNITED STATES ARMY, VIETNAM, APO San Francisco 96375 21 JUN 1969

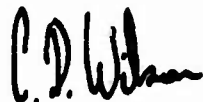
TO: Commander in Chief, United States Army, Pacific, ATTN: GPOP-DT,  
APO 96558

1. This headquarters has reviewed the Operational Report-Lessons Learned for the quarterly period ending 30 April 1969 from Headquarters, 54th Field Artillery Group.

2. Reference item concerning Employment of Improved Conventional Munitions in the immediate response role, section II, page 12, paragraph b(1). Concur with the unit's recommendation that their ICM test be given consideration by appropriate evaluation agencies. Nonconcur that the data and information from the test be made available to all artillery units. The information obtained by the 54th Field Artillery Group is limited and not based on sufficient scientific data to warrant dissemination to field units. The problem areas discussed are presently being evaluated by agencies in CONUS to determine artillery firing effects, safety, and munitions data. Appropriate information will be furnished field commands as it becomes available. No further action required.

FOR THE COMMANDER:

Cy furn:  
54th Field Arty Gp  
II FFV



C. D. WILSON  
1LT, AGC  
Assistant Adjutant General

GPOP-DT (15 May 69) 4th Ind (U)  
SUBJECT: Operational Report of HQ, 54th Fld Arty Gp for Period  
Ending 30 April 1969, RCS CSFOR-65 (R1)

HQ, US Army, Pacific, APO San Francisco 96558 11 JUL 69

TO: Assistant Chief of Staff for Force Development, Department of the  
Army, Washington, D. C. 20310

This headquarters has evaluated subject report and forwarding indorsements and concurs in the report as indorsed.

FOR THE COMMANDER IN CHIEF:

  
C. L. SHORT  
CPT, AGC  
Asst AG

UNCLASSIFIED

Security Classification

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